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Dendrochronological Analysis of The Morgan House, Wayne County, Wooster, Ohio

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Progress Report: Dendrochronological Analysis of The Morgan House, Wayne County, Wooster, Ohio

May 24, 2006

Report submitted to Mrs. Susan Burt as an update of ongoing work on the Morgan site. A final report will be submitted upon conclusion of the site study.

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General Analysis: Cores and sections of the Morgan House were processed and crossdated (Fig 1) at the Wooster Tree Ring Lab using standard dendrochronological techniques (Stokes and Smiley, 1968). These techniques include preparing the cores surfaces, counting rings, measuring and crossdating ring-widths. Ring-widths were measured to the nearest 0.001 mm and crossdating was performed visually and using the computer program COFECHA (Holmes, 1983).

The 21 samples from the house and barn (Tables 1 & 2) were internally crossdated with one another to construct a floating ring-width series. This floating chronology was then absolutely dated against calendar-dated, living, ring-width chronologies from the region including Johnson Woods, Sigrist Woods, and Brown's Lake Bog (ITRDB, 2005; Wooster Tree Ring Lab, unpublished data, 2005). The floating ring-width chronology from the Morgan House and barn sites spans 244 years and when adjusted to calendar dates ranges from AD 1622-1846.

Tables 1 and 2 summarize the calendar dates of each sample and the presence of an outer ring in the samples. Outer rings provide a calendar date for when the tree was cut. Although many samples include the sapwood, not all of the samples in the house and barn indicate the last year of growth, as they do not have an outer ring. The earliest cut date of the house is AD 1844 and the latest cut date is AD 1846. Sample MH05 was taken from the kitchen, which leads us to believe that it was built onto the structure at a later period. The barn (Table 2) was likely built in 1838 as indicated by MB10: this barn

series ranges from 1622-1838. All of the plugged core holes were labeled in the house so that samples can be keyed directly to the beams for further interpretation.

All cores and data are archived at the Wooster Tree Ring lab, which is housed in Scovel Hall in the Department of Geology at The College of Wooster.

Table 1: List of tree-rings from the Morgan House. Samples providing an outer ring are underlined.

	Sample	Beginning Year	End Year	Years
1	MH01	1785	<u>1845</u>	61
2	MH02	1731	1817	87
3	MH03	1730	1823	94
4	MH04a	1711	1825	115
5	MH05	1692	<u>1846</u>	115
6	MH06	1735	<u>1844</u>	110
7	MH7	1678	1798	121

Table 2: List of tree-rings from the Morgan Barn. Samples providing an outer ring are underlined.

	Sample	Beginning Year	End Year	Years
1	MB1	1712	1807	96
2	MB2	1695	1824	130
3	MB3	1710	1818	109
4	mb4a	1676	1809	134
5	MB07	1739	<u>1835</u>	97
6	MB08	1622	1731	110
7	MB10	1710	<u>1838</u>	129
8	MB11	1668	1821	154
9	MB13	1676	1800	125
10	MB14	1693	1802	110
11	MB15	1672	<u>1830</u>	159
12	MB16	1699	1827	129
13	MB17	1673	<u>1829</u>	157
14	MB18	1685	1818	134

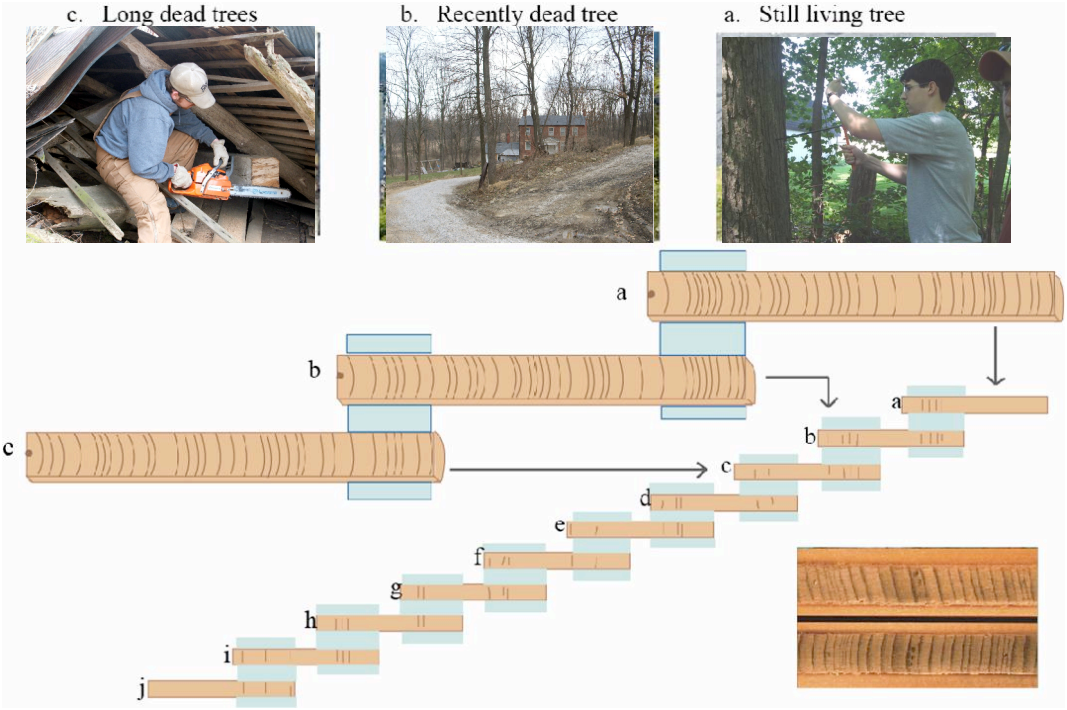

Figure 1: Principles of Crossdating (Anne Krawiec, 2005).

The process of crossdating (Fig 1) allows one to match together overlapping width patterns similar in living and dead trees to extend the tree-ring chronology. Cores may vary in time period and number of rings, but when patterns from differing samples align, rings link together to create one long tree-ring series that spans over many more years than a single sample. The extended record serves to correctly date and place other samples within the chronology. Crossdating aids in developing and extending the tree-ring width chronology for NE Ohio region that will contribute to the understanding of climate variability over the last several hundred years.

References:

Holmes, R.L. 1983. Computer-assisted quality control in tree-ring dating and measurement. *Tree-Ring Bulletin,* **43** (1), 69-78.

Stokes, M. A., and Smiley, T. L., 1968: *An Introduction to Tree-Ring Dating*. Chicago: University of Chicago Press. 73 pp.

International Tree-Ring Data Base (ITRDB), 2005,www.ncdc.noaa.gov/paleo/paleo.html.